Abdominal Wall Hernias

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Lesson Objective

- **Describe the etiology, pathology, clinical evaluation, and treatment of abdominal wall hernias including inguinal, femoral, umbilical, epigastric, Spigelian, and incisional hernias.**

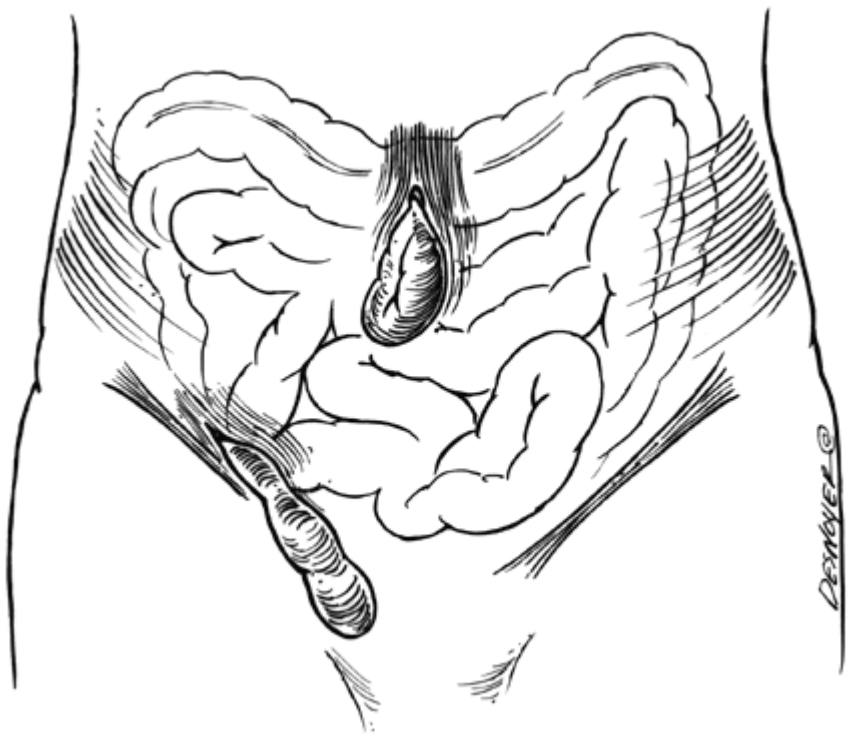
Hernia

- **Protrusion of the peritoneum or preperitoneal fat through an abnormal opening in the abdominal wall**
- **Presents as a bulge**
- **Peritoneal contents may be trapped in “sac”**

Hernia Characteristics

- Asymptomatic bulge most common
- Symptoms
  - Physical effects of sac and contents on surrounding tissues
  - Obstruction and/or strangulation of hernia sac contents

Areas of Natural Weakness



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Hernia Diathesis

- Varies with age
  - Pediatric: congenital remnant
  - Adult
    - Tissue weakness
    - Burst strength < abdominal wall tension
- Varies with gender

Hernia Diathesis

- **Pediatric: major risk is premature birth**
- **Adult**
  - **Obesity**
  - **Previous abdominal surgery**
  - **Pregnancy**
  - **Abrupt abdominal wall exertion**

Clinical Evaluation: History

- Demographics
  - Age
  - Gender
- Presentation of bulge
  - When, where, how
  - Activities that make it better or worse
  - Discomfort vs. pain
  - Signs/symptoms of bowel obstruction

Clinical Evaluation: History

- **Surgery: previous repairs/operations**
- **Review of factors related to increased intra-abdominal pressure**
  - **Chronic cough**
  - **Constipation**
  - **Straining to urinate**

Clinical Evaluation: Physical Exam

- Inspection
  - Scars in proximity
  - Location of bulge
    - Straining
      - Standing
      - Leg lift
    - Size

Clinical Evaluation: Physical Exam

- **Palpation <u>bilaterally</u>**
  - **Anterior reducibility**
  - **Digital reducibility**
  - **Size of defect**
  - **Firmness**
  - **Tenderness**

Clinical Evaluation: Physical Exam

- **Examination of Related Regions**
  - **May reveal alternate or additional diagnoses**
  - **Scrotum**
  - **Contralateral groin**
  - **Location of testes**
- **Screen for asymptomatic hernias**

Clinical Evaluation: Location

- Groin: 75%
  - Inguinal
  - Femoral
- Anterior abdominal wall: 25%
  - Umbilical
  - Epigastric
  - Spigelian
  - Incisional

Hernia Pathology

- **Contents of hernia sac**
  - **Bowel (small and large, appendix)**
    - **Incarceration of portion of bowel wall: Richter's hernia: Strangulation occurs without obstruction**
  - **Omentum, bladder, ovary, fallopian tubes**
- **Sac wall may be formed by large bowel, bladder, or the ovary/tube: Sliding hernia**

Hernia Pathology

- **Fascial defect may exist without peritoneal hernia sac**
- **Preperitoneal abdominal wall contents may protrude through fascial defect**
  - **Preperitoneal fat**
  - **Lymph node**

Hernia Pathology

- **Incarceration: contents of hernia sac not reducible into peritoneal cavity**
  - **Acute: fascial margins trap contents**
  - **Chronic: contents adhesed in sac**

- **Strangulation: incarceration with compromise of blood supply**
  - **Narrow neck at greatest risk: indirect inguinal, femoral, and umbilical**

Hernia Repair Indications

- **Asymptomatic**
  - **prevent visceral incarceration and/or strangulation**
- **Symptomatic, non-obstructed**
  - **Treat discomfort from bulge**
  - **Prevent incarceration/strangulation**
- **Visceral obstruction/strangulation**
  - **Release obstruction/manage viscera**
  - **Prevent recurrence**

Groin Hernia

- **Men : Women 25 : 1**
- **Right : Left 2 : 1**

- **Femoral**
  - **Women > Men**
  - **Strangulation risk > inguinal**
- **Inguinal**
  - **Indirect : Direct 2 : 1**
  - **Most common in men and women**

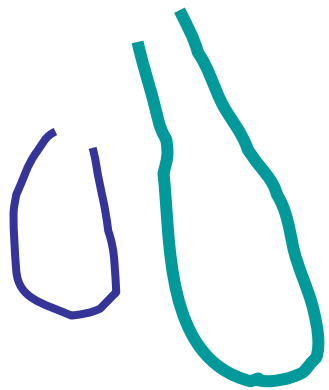
Groin Hernia

Anterior superior iliac spine

Right inguinal ligament

Inguinal

Femoral



Pubic tubercle

Groin Hernia

- **Inguinal: relationship of sac to inguinal canal determines external bulge**
  - **Movement from internal ring to scrotum**
  - **Bilateral hernias: direct 4x indirect**
  - **Indirect vs. direct hernia is intraoperative diagnosis, not clinical diagnosis**
- **Femoral: relationship of sac to inguinal ligament determines external bulge**

Groin Hernia: Inguinal

- **Adults**
  - **Weakness of transversalis fascia**
  - **Indirect: sac is lateral to inferior epigastric vessels**
  - **Direct: sac is medial to inferior epigastric vessels**
  - **Pantaloon: both indirect and direct**

- **Pediatric: patent processus vaginalis**

Abdominal Wall Layers

Skin

External oblique

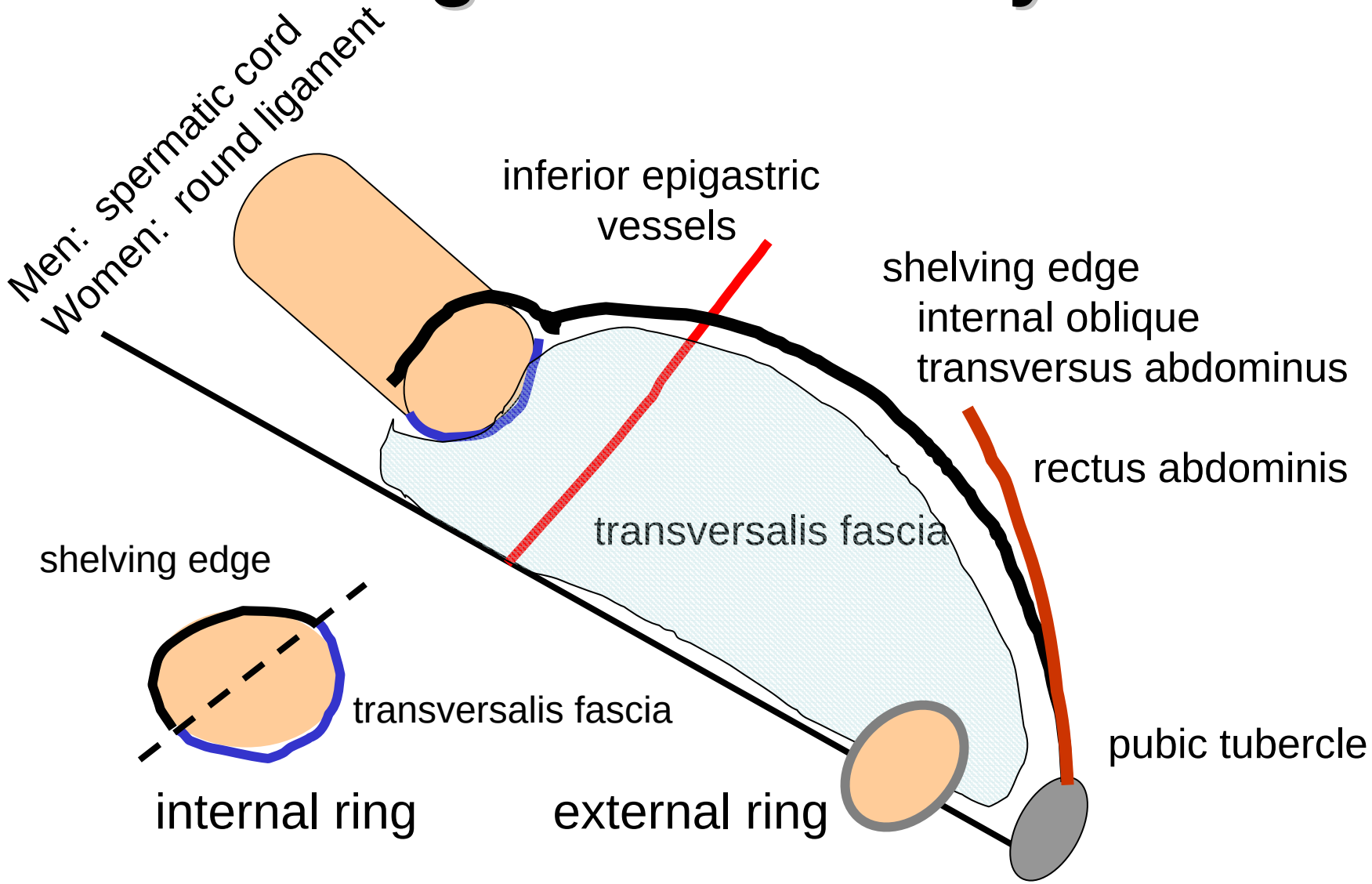
Internal oblique

Transversus abdominus

Transversalis fascia (major strength layer)

Peritoneum

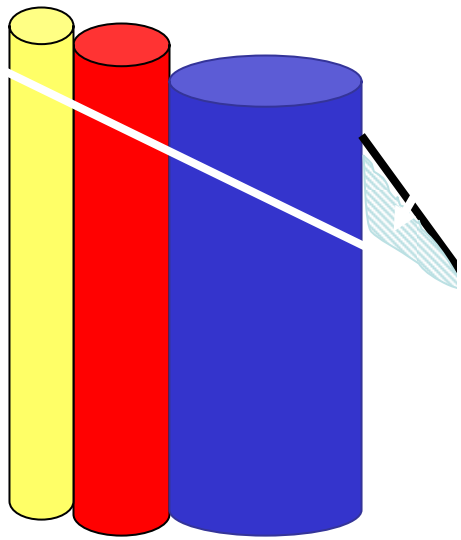
Inguinal Anatomy



Femoral Anatomy

inguinal ligament

femoral canal



Cooper’s ligament

Iliopubic tract

femoral nerve, artery, and vein

Groin Hernia: Differential Diagnosis

- Tendonitis
- Muscle tear
- Lymph node
- Lipoma
- Varicose vein
- Hydrocele
- Epididymitis
- Spermatocele

Groin Hernia Management

- **Most hernias: ambulatory OR**
  - **Local/regional/general anesthesia**
  - **Prohibitive operative risk: truss**

Groin Hernia Management

- Acute incarceration
  - Reduction (taxis)
    - Distal traction and gentle milking
    - Caution: reduction en masse
    - Successful reduction shows visually
  - Urgent elective repair if reduced

Groin Hernia Management

- **Emergent repair**
  - **Irreducible acute incarceration**
  - **Strangulation**
- **Fluid, electrolyte resuscitation**

Groin Hernia
Surgical Classification (Nyhus)

- I: Indirect hernia w/normal internal ring
- 2: Indirect hernia w/enlarged internal ring
- 3a: Direct inguinal hernia
- 3b: Indirect hernia with weak floor
- 3c: Femoral hernia
- 4: All recurrent hernias

Groin Hernia Surgery: Open

- **Indirect sac: high ligation**
  - **Men: ligation at internal ring**
  - **Women: ligation/excision of round ligament with closure of internal ring**
  - **Cord lipoma: excision**

Groin Hernia Surgery: Open

- **Inguinal floor: tension-free repair with mesh**
  - **Anterior plug and patch**
  - **Anterior patch**
  - **Posterior patch (Stoppa)**

Groin Hernia Surgery

- **Open tissue repair for risk of infection (example: strangulated hernia)**

- **Laparoscopic**
  - **Indications**
    - **Recurrent hernia**
    - **Bilateral hernias**
  - **Must be able to tolerate general anesthesia**
  - **More expensive**

Groin Hernia Repair Complications

- **Recurrence**
  - **Tissue repair: 1.3—25%**
  - **Tension-free mesh: 0.5—5%**
- **Greatest risk is repair of previous hernia at same location**

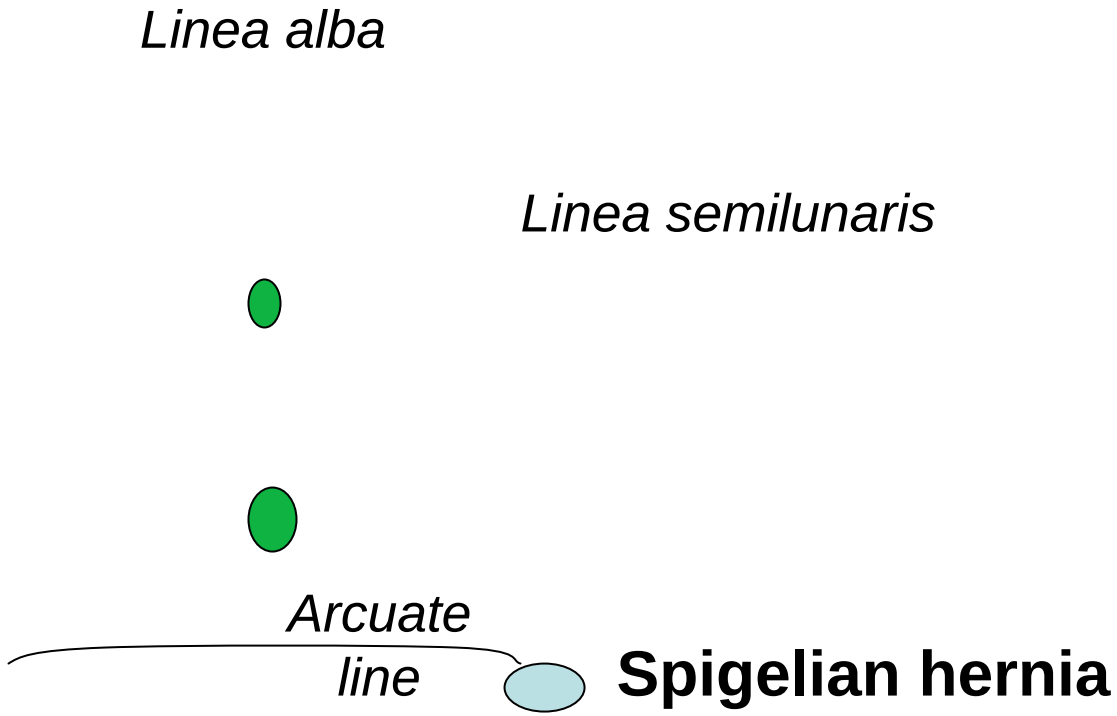
Groin Hernia Repair Complications

- **Chronic groin pain: up to 30%**
- **Numbness over base of scrotum**

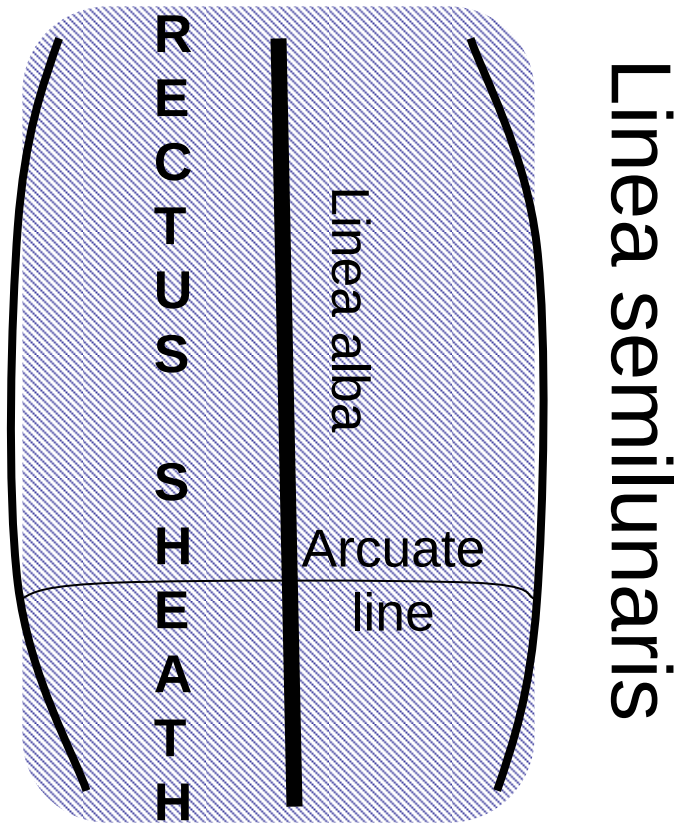
Groin Hernia Repair Complications

- **Wound**
  - **Hematoma: 1.0%**
  - **Infection: 1.3%**
  - **Seroma**
- **Infertility**
  - **Injury to vas deferens**
  - **Ischemic orchitis is uncommon**
- **Urinary retention**

Abdominal Wall Hernias Above the Groin



Abdominal Wall Anatomy

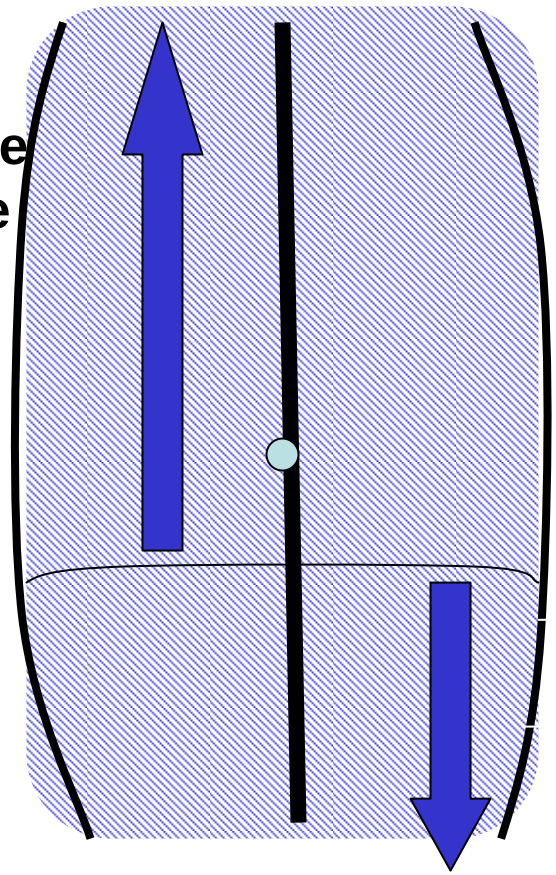


Abdominal Wall Anatomy

Rectus Sheath

External oblique
Internal oblique

Transversalis



External oblique

Internal oblique

Transversalis

Midline Abdominal Wall Hernia

Sac

Rectus **Rectus**

Pre-peritoneal fat
Peritoneum

Umbilical Hernia

- **Fascial defect at the umbilicus with peritoneal sac covered by skin**
  - **External bulge at the umbilicus or periumbilically depending on subcutaneous migration of sac**
- **Exam: External bulge at or adjacent to the umbilicus**

Pediatric Umbilical Hernia

- Present in 10-30% of babies
- 80% close spontaneously by age 2
- Indications for primary suture repair
  - Hernia present after ages 2-4
  - Large (5 cm) defect at age 1

Adult Umbilical Hernia

- Increased intra-abdominal pressure
  - Pregnancy
  - Obesity
  - Ascites
- Differential diagnosis (rare)
  - Embryologic remnants
  - Metastatic cancer

Adult Umbilical Hernia

- Symptoms relate to cosmesis, traction on the sac, or trapped contents
  - Omentum
  - Small or transverse colon
- Acute incarceration: reduction en masse problematic

Adult Umbilical Hernia Repair

- Assess contents and manage appropriately based on viability
- Open hernia repair
  - < 1 cm defect: primary suture repair
  - ≥ 1 cm defect: mesh repair lowers recurrence
- Laparoscopic hernia repair: size of access ports often > hernia incision

Adult Umbilical Hernia Repair

- Risks
  - Recurrence
  - Umbilical necrosis
  - Injury to sac contents
  - Hematoma
  - Infection

Epigastric Hernia

- **Fascial defect in supraumbilical linea alba**
  - **Most < 1 cm**
  - **20% with multiple defects**
  - **Beware diastasis recti**
- **Men: Women 2:1**

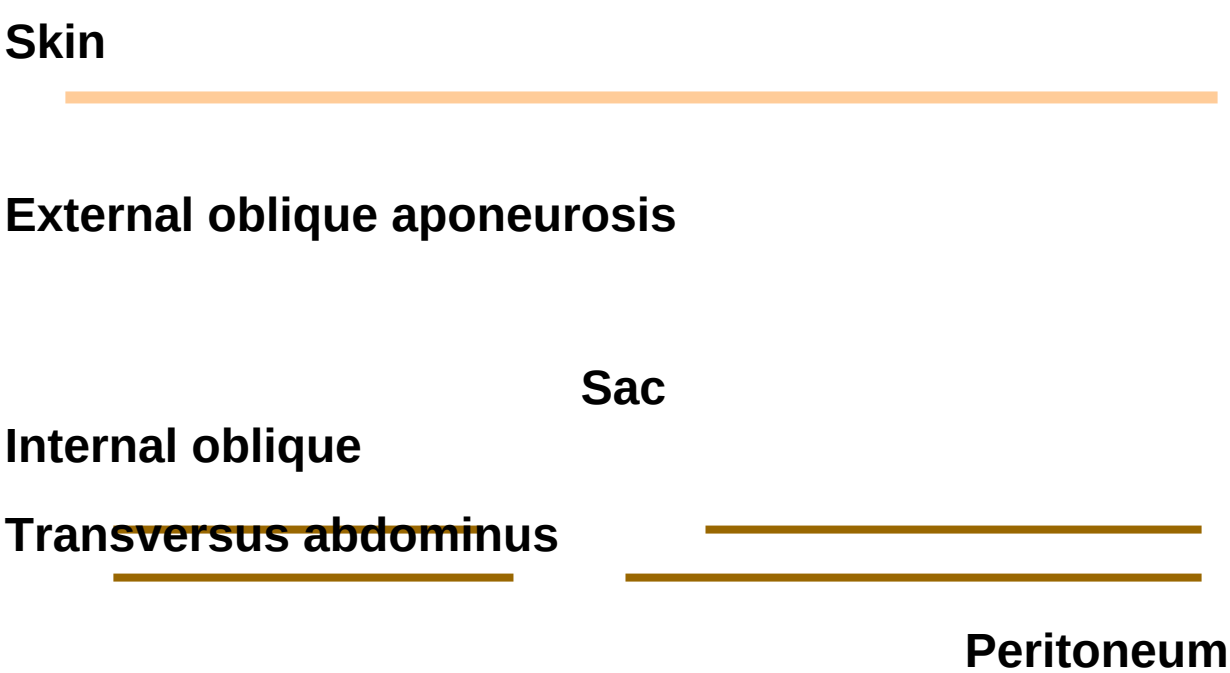
Epigastric Hernia

- Contents
  - Incarcerated preperitoneal fat or falciform ligament
  - Peritoneal sac
- Repair
  - Open repair similar as for umbilical hernia
  - Must palpate or visualize entire supraumbilical linea alba
  - Laparoscopic approach is suboptimal

Spigelian Hernia

- Defect through transversus abdominus and internal oblique muscles
  - Occurs at junction of arcuate line and linea semilunaris
  - Fascial defect 1-2 cm
  - Covered by external oblique aponeurosis

Spigelian Hernia



Spigelian Hernia

- **Presentation**
  - **Lower abdominal swelling lateral to rectus**
  - **Focal discomfort/pain**
- **May require imaging studies for diagnosis**
  - **Ultrasound or CT**
- **Repair: open or laparoscopic, on-lay mesh**

Incisional Hernia

- Bulge in region of scar from surgery or penetrating trauma
- Chronic wound failure
  - Up to 20% of abdominal incisions
- Subcutaneous sac may be more complex
  - Multi-loculated
  - Contents adhesed within sac

Incisional Hernia: Risk Factors

- Previous incisional hernia repair
- Obesity
- Smoking
- Chronic lung disease
- Diabetes
- Malnutrition
- Wound infection

Incisional Hernia Repair

- **Fix conditions that promoted hernia occurrence**
- **Open repair**
  - **Primary suture: ≤ 52% recurrence**
  - **Mesh: ≤ 24% recurrence**

Incisional Hernia Repair

- **Complex open repairs**
  - **Stoppa mesh repair**
  - **Component separations repair**

- **Laparoscopic repair**
  - **Multiple fascial defects detected**
  - **Large on-lay intraperitoneal mesh**
  - **5 cm marginal overlap**

Incisional Hernia

- **Complications of repair**
  - **Recurrence**
  - **Seromas**
  - **Injury to sac contents**
  - **Bleeding**
  - **Infection**

Review

- **Pediatric hernias**
  - **Inguinal**
  - **Umbilical**
- **Adult hernias**
  - **Groin**
    - **Inguinal**
    - **Femoral**
  - **Umbilical**
  - **Epigastric**
  - **Spigelian**
  - **Incisional**

Points to Remember

- **Hernias represent fascial defects with protrusion of a peritoneal sac or preperitoneal fat**
- **Asymptomatic bulge most common**
- **Hernia risk is related to visceral obstruction or strangulation**
- **Tension-free repair with mesh produces lowest recurrence rates**

Summary

- **Etiology, pathology, clinical evaluation, and treatment of abdominal wall hernias including inguinal, femoral, umbilical, epigastric, Spigelian, and incisional hernias**